

PUBLIC DRINKING WATER WORKING GROUP REPORT

FINAL REVIEW DRAFT

Protecting Drinking Water
In the Southern Willamette Valley
Groundwater Management Area

Prepared by Lane Council of Governments
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Executive Summary

The Department of Environmental Quality (DEQ) declared the Southern Willamette Valley Groundwater Management Area because of high nitrate in the region's aquifer (Eldridge, 2004). To resolve the issues of contaminated groundwater, the DEQ and project partners formed the Groundwater Management Area Committee to develop strategy recommendations to include in a DEQ-approved Action Plan. The Public Drinking Water Working Group was formed along with three other working groups (residential, commercial/industrial, and agriculture) to focus on specific topic areas related to groundwater contamination. This report presents the drinking water protection recommendations of the Public Drinking Water Working group and the supporting background information that those recommendations are based on.

The Public Drinking Water Working Group efforts focus on the 54 water systems and the 14,000 people served by those water systems within the GWMA (Oregon Department of Human Services and Oregon Department of Environmental Quality, 1999-2005). There is a blend of both large and small water systems in the region. There are 39 public water systems (systems serving at least 25 people or having 15 connections) such as Junction City, serving over 4,000 people, and Shadow Hills, serving about 45 people. There are 15 smaller state regulated systems, such as trailer parks or small businesses, which serve fewer than 25 people or have less than 15 connections. The majority of water systems are located in or near municipalities clustered in the southern portion and the northern fringe of the GWMA. Most of these systems rely on a shallow aquifer which is susceptible to potential contamination from a variety of land uses.

The Public Drinking Water Working Group, comprised of staff, public officials, technical experts, and water system operators, initiated their work at a half-day workshop and held two subsequent meetings. During these proceedings group members learned about the drinking water protection issues in the area, talked about what would and wouldn't work to protect the drinking water supply for the region, and developed clear goal and strategy recommendations for the GWMA Committee to include in the Action Plan. It is important to note that the Public Drinking Water Working Group, as compared with the other working groups, is focused on all potential risks to the public drinking water supply, not just nitrate, and how the multiple land uses in the region can potentially impact the water supply.

The DEQ and Department of Human Services (DHS) Drinking Water Program have completed Source Water Assessments for the public water systems in the GWMA. These assessments clearly identify the area that public systems get their water from and include an inventory of potential risks within that area. This provides each individual system and the region as a whole with an idea of where to focus drinking water protection efforts.

There are 264 potential contaminant sources within the drinking water protection areas of 15 of the larger public water systems in the GWMA. Seventy-five percent (197) of those sources are rated high or medium risk (Oregon Department of Human Services and Oregon Department of Environmental Quality, 1999-2005). Within the area that is relatively close to the wells, where it is estimated that a contaminant could reach the water supply within a five-year time frame, there

are 197 potential contaminants with about seventy-five percent of those considered a high or medium risk. The most common potential contaminant sources include; agriculture (irrigated and non-irrigated), heavily used transportation corridors, large on-site septic systems, wells/abandoned wells, and high-density housing. The Source Water Assessment information provided a thorough evaluation of the potential contamination sources in the region and ensured that the strategy recommendations are targeted to the most pressing risks.

The Working Group's strategy recommendations fall within seven broad goals seen as being the most important focal areas for protecting public drinking water in the region:

- Outreach and Education
- Financial Incentives
- Water Conservation
- Recognition Programs
- Technical Assistance and Training
- Zoning/Health Ordinances
- Regulation and Enforcement

These goals focus on pollution prevention to protect the drinking water source, meet water quality standards, avoid costly remediation, prevent the burden of finding a new source, and uphold the community's reputation for having a clean drinking water supply. Related to the goals are about 30 specific strategies that describe the actions necessary to protect drinking water and public health. These goals and strategies comprise the core of the recommendations being forwarded to the GWMA Committee to be included in the overall Southern Willamette Valley Groundwater Management Area Action Plan.

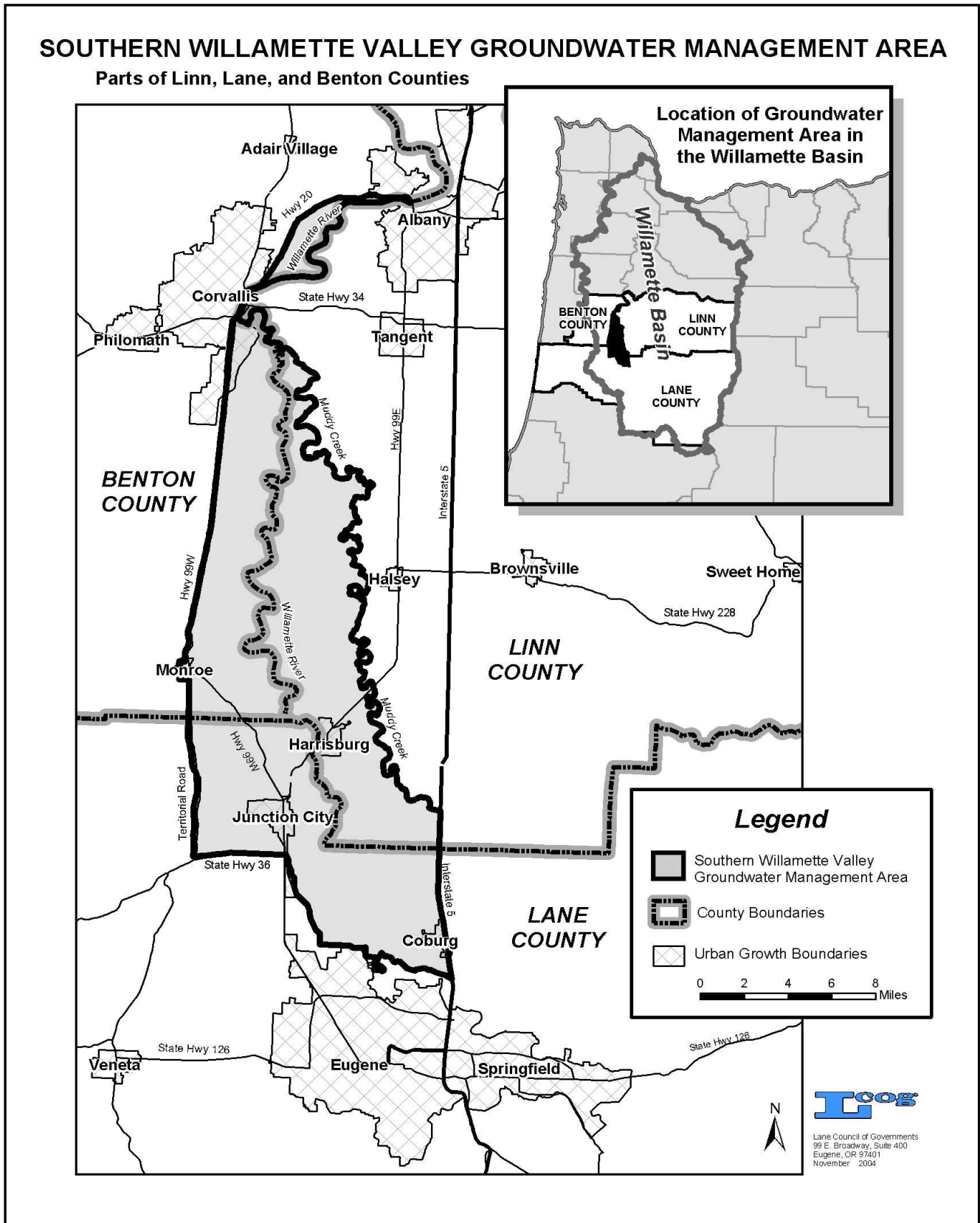
Introduction

The Oregon Department of Environmental Quality (DEQ) declared the Southern Willamette Valley Groundwater Management Area (Figure One) in May 2004 after several studies indicated that nitrate levels in the region's groundwater are high. When sampling demonstrates that nitrate levels exceed seven parts per million over a widespread area, state law (OAR 340-40-90) justifies the DEQ in declaring a Groundwater Management Area (GWMA). In response to this designation, a committee of diverse stakeholders (GWMA Committee) has been convened to study the issues, deliberate on appropriate actions to lessen the problem, and develop recommendations for an Action Plan.

Due to the diversity of land uses and the high level of interest from local residents and businesses, the GWMA Committee is developing the recommendations for the Action Plan through the establishment of, and input from, four specific working groups. This report represents the work accomplished by the Public Drinking Water Working Group. Primarily this group operates as a body of stakeholders and experts on public drinking water issues established to develop strategy recommendations for the GWMA Action Plan. In the process, they are providing the region with a vision of clean, secure drinking water and laying out the steps necessary to achieve that goal.

This report includes a profile of the water systems and drinking water issues in the region, a summary of the process the Public Drinking Water Working Group used to reach decisions during the first six months of 2005, and a risk analysis of potential contaminants in the public water system drinking water protection areas within the GWMA. In many ways, the heart of this report is the Goals and Strategy Recommendations section. The Public Drinking Water Group developed these recommendations for inclusion in the GWMA Action Plan. These actions will reduce risks to public water systems from nitrate as well as other potential contaminants.

Figure 1
Southern Willamette Valley Groundwater Management Area Location and Boundary



Regional Public Water Systems Profile

Public water systems provide an extremely valuable service to their customers. Public water systems find, collect, treat, and distribute the water that flows to our houses, businesses, schools, restaurants, and public buildings.

Overall there are 54 water systems that will benefit from the work of the Public Drinking Water Working Group. These water systems collectively serve about 14,140 people (Oregon Department of Environmental Quality and Oregon Department of Human Services 1999-2005). The results of the Public Drinking Water Working Group proceedings will also be of benefit to domestic well owners, jurisdictions locating new sources of water to meet the demands of growing populations, and water systems outside the GWMA.

A public water system is a water distribution network that serves at least 25 people or has at least 15 service connections for more than 60 days a year. There are approximately 160,000 federally regulated water systems currently operating in the United States (U.S. Environmental Protection Agency, 2004). These systems fall into three broad categories:

Community water systems such as a city or a manufactured home park

Transient water systems such as gas stations or roadside rest areas

Non-Transient/Non-Community water systems such as a school or a large industrial park

Within the Groundwater Management Area there are 39 public water systems; 13 Community, 18 Transient, and 8 Non-Transient/Non-Community systems. The systems serve a wide range of populations, from the Junction City water system that serves 4,285 people to the Shadow Hills Water Cooperative that serves 45 people. Fifteen of the systems in the GWMA are relatively small, serving populations of less than 25 people. These systems operate outside of federal regulation and are not technically considered *public* water systems. Table 1 outlines the types of water systems within the GWMA.

Table 1
Water Systems and Service Populations in the Groundwater Management Area (GWMA)

Type of System	Number in GWMA	Range of service population
Community	13 (2 surface water)	45 – 4,285
Non-Transient/Non-Community	8	60 – 320
Transient	18	25 – 215
State-regulated	15	10 – 24
Total	54 (2 surface water)	Approximately 14,140 people

Source: Department of Environmental Quality and Department of Human Services-Drinking Water Program, [Source Water Assessment Reports](#), 1999-2005

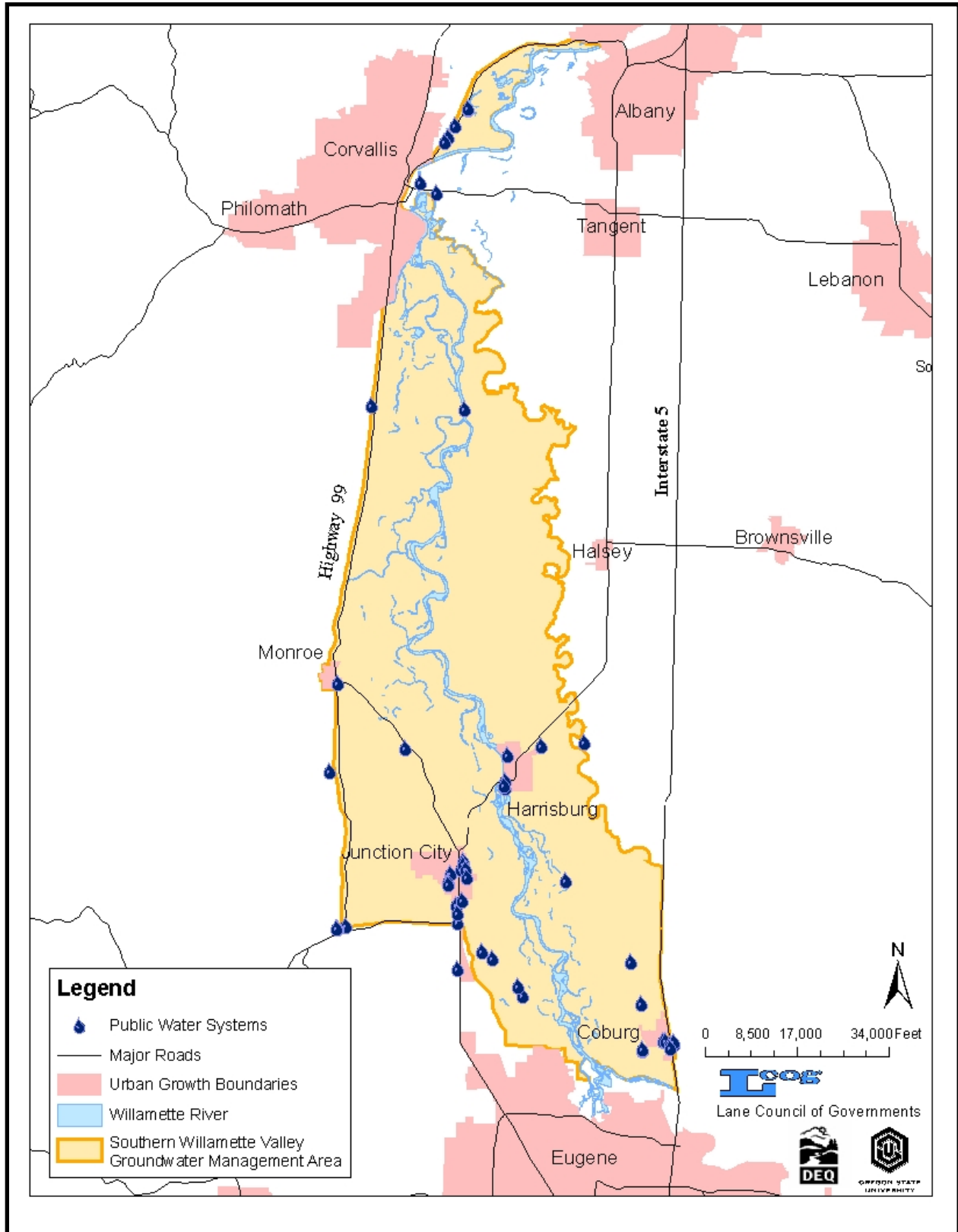
Most of the systems in the region depend on a shallow aquifer to provide a clean, steady supply of water. This aquifer is classified as unconfined, which means it has no solid rock or confining layer protecting it from contamination infiltrating down from the ground surface. Near the Willamette River the aquifer and river are closely connected. In many places close to the river, during the wetter times of the year water feeds into the aquifer from the river. During the drier

months water flows out from the aquifer and helps sustain river flows. The aquifer exists almost entirely within the historic floodplain of the Willamette River. Geologically, this area is comprised of porous alluvial deposits and sedimentary formations that have been deposited from massive floods and glacial activity. The soil is very permeable and the historically high amount of rainfall makes this shallow aquifer susceptible to outside contamination.

There are a wide variety of land uses within the Southern Willamette Valley GWMA. A portion of the Corvallis urban area along the northeast side of the GWMA and the smaller cities of Monroe, Harrisburg, Junction City, and Coburg contain the largest municipal water systems and the most diverse land uses. Of the 223 square miles within the GWMA, roughly 15 square miles are classified as urban or developed rural lands whereas approximately 207 square miles are under agricultural use. The remaining square mile is managed for timber production (Oregon Geospatial Enterprise Office).

Besides municipal water systems in cities; schools, large businesses, gas stations, restaurants, and other operations that tend to have public water systems are usually located in or around incorporated areas. Figure 2 displays the geographic location of the systems in the region. In the GWMA, the majority of the water systems exist in clusters around the southern end of the region near Junction City, Coburg, and Harrisburg. There is a gap through the middle of the GMWA where large acreages are under agricultural. This area is not densely populated and contains mostly domestic wells. Public water systems become more frequent near Corvallis on the northern end of the GWMA.

Figure 2
 Locations of Public Water Systems in the
 Southern Willamette Valley Groundwater Management Area



Process and Stakeholder Participation

The Public Drinking Water Working Group is one of four working groups assisting the GWMA Committee in forming strategy recommendations for the Action Plan. The Residential, Agriculture, and Commercial/Industrial working groups are researching the nitrate sources from those land uses and determining what land use-specific management strategies can be implemented to prevent groundwater contamination from nitrate. The nature of the Public Drinking Water Working Group is a little different than the other three. The Public Drinking Water group is looking at how the variety of land uses could impact public drinking water supplies. The group is identifying what *all* sectors can do to prevent drinking water contamination from nitrate as well as a variety of other potential contaminants.

Comprised of public water system operators, city councilors, county environmental health staff, county commissioners, and state agency staff, this group represents a wide range of interests and has technical expertise in many areas. The Public Drinking Water Working Group began its process at a workshop in February 2005 with the purpose of informing water system operators, technical staff, and public officials of drinking water activities in the region and to get input on which drinking water protection efforts to pursue. This workshop included informational items followed by a collaborative exercise to determine preliminary goals and protection strategies. Attendees were presented with a list of 11 potential goals and rated each on a scale of 0 – 4. The results of this exercise gave the working group a place to start when developing specific strategy recommendations.

Two subsequent meetings refined the work generated at the initial workshop. Staff used the results of the Source Water Assessments to focus goal and strategy recommendations. Working group members were asked to complete strategy templates that outlined the detailed actions, potential implementation partners, and measures of effectiveness for each proposed strategy. The diverse input coupled with the detailed Source Water Assessment information produced a comprehensive list of potential drinking water protection strategies.

After review and discussion, the working group agreed to move forward with the seven goals and about 30 related strategies identified through the collaborative process. The goals are broad level statements about the methods that should be employed to protect drinking water from contamination. All of the proposed strategies fall under one of these broad level goals. The strategies are detailed actions that address particular problems posing a threat to drinking water. Rather than focusing on expensive treatment options, the goals and strategies are preventative approaches intended to avoid the costly and detrimental ramifications of a contaminated drinking water source. The following section identifies the risks to drinking water in the GWMA that the goals and strategies are targeted to address.

Risk Analysis

The known contaminant and the reason for the GWMA declaration is high nitrate levels in groundwater. Nitrate is most often associated with agricultural and residential fertilizers, but there are many possible sources. The effluent from residential septic systems can contain over 60 mg/L of nitrate as can the effluent from larger permitted wastewater facilities. The nutrient-rich runoff from Confined Animal Feeding Operations (CAFOs), such as cattle feedlots, can also elevate nitrate levels. Golf courses, high-density residential areas, and pet wastes also contribute to the overall nitrate load in surface and groundwater. High levels of nitrate can indicate vulnerability to all types of contamination.

Fifteen public water systems in the GWMA have tested positive for nitrate levels greater than 7.0 mg/L in the past 5 years. The Maximum Contaminant Level set by the U.S. Environmental Protection Agency is 10.0 mg/L. The Oregon Department of Environmental Quality considers 7.0 mg/L as a warning that indicates a potential nitrate problem (Eldridge, 2004). Nitrate is difficult and expensive to remove from public systems. Preventing nitrate contamination meets health standards while reducing the need for expensive treatment.

Besides nitrate there are many potential contaminants that could threaten the quality and security of drinking water in the region. These risks to drinking water safety include everything from a hazardous waste spill on a heavily used road to wastewater treatment plants and pesticide processing operations. Due to the wide range of potential risks and the high level of susceptibility, the Public Drinking Water Working Group broadly considered all potential contaminant sources, not merely sources of nitrate, as it developed strategy recommendations. These potential contaminant sources are directly linked to the way the land above the aquifer is being used and managed.

Overall, 264 potential contaminant sources have been inventoried in the GWMA through the Source Water Assessment process. Source Water Assessments stem from a requirement in the Safe Drinking Water Act that water sources and risks facing those water sources be identified for all public water systems in the country. Source Water Assessments are conducted by staff from Oregon's Drinking Water Protection Program, a joint effort between the DEQ and the Department of Human Services (DHS). Source Water Assessments have been completed for 15 Community and Non-Transient/Non-Community water systems in the GWMA. These are the larger systems in the region and are a good representation of the issues facing all of the systems in the region, including very small systems and domestic wells.

Source Water Assessments include the following components:

- A **delineation** of the Drinking Water Protection Area (including Time of travel Zones)
- An **inventory** of potential contaminant sources
- A **susceptibility analysis**

The Drinking Water Protection Area delineation (including time of travel zones) and the inventory of potential contaminant sources are the two attributes of the Source Water Assessments that were most highly utilized in this regional planning process.

The delineations identify the area from which a well draws its water. Time of travel zones were developed to give a tangible indication of how quickly contamination could reach the water distribution network. There are two-, five-, ten-, and fifteen-year time of travel zones. According to the models used, a drop of water that enters the aquifer within the two-year time of travel zone will be assimilated into the drinking water supply within two years, in the five-year zone it will take five years, and so on.

The inventory of potential contaminant sources is designed to identify and locate significant potential sources of contamination within the drinking water protection area. The sites and areas identified are only potential sources of contamination to the drinking water, and water quality is not likely to be impacted if contaminants are managed properly. Potential contaminant sources are assigned a rating of high, medium, or low to indicate the level of potential risk to the water supply.

The following table and graph summarize the data from the 15 Source Water Assessments. Table 2 shows the number of potential contaminant sources within the GWMA, their risk level, and their time of travel zone.

Table 2
Potential Contaminant Sources
in the Southern Willamette Valley Groundwater Management Area
Classified by Risk Category and Time of Travel Zone (TOT)

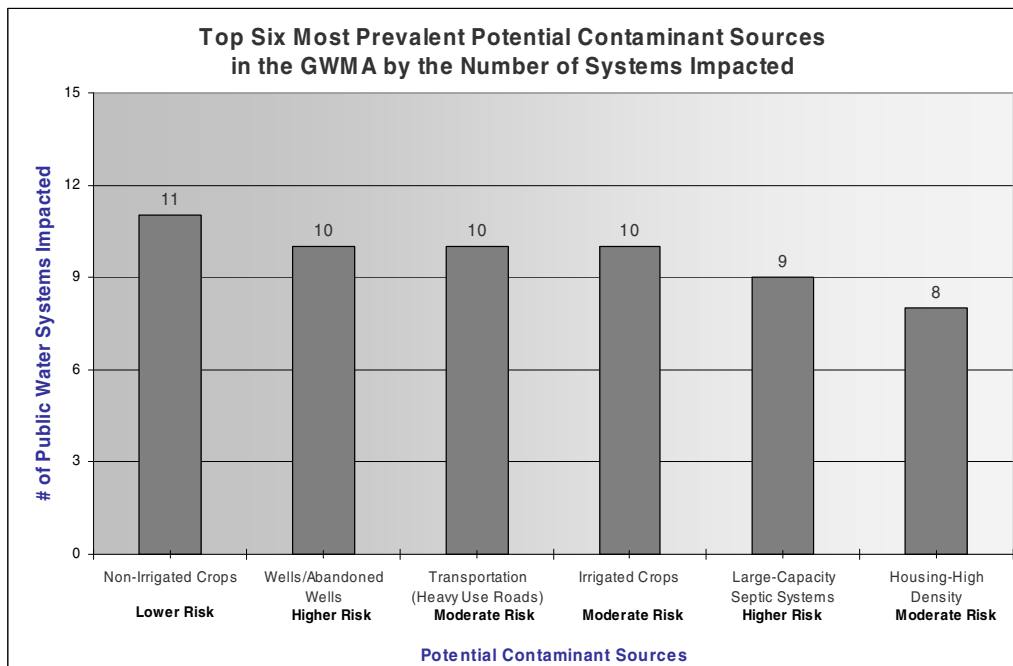
Potential Contaminant Source Risk	2 Year TOT	2 to 5 Year TOT	5 to 15 Year TOT	Total
High Risk	52	28	22 (1 just outside)	102
Moderate Risk	48	21	26	95
Lower Risk	20	20	10	50
Other (Risk Unclassified)	5	4	8 (1 just outside)	17
Total	125	73	66	264

Source: Department of Environmental Quality and Department of Human Services-Drinking Water Program, Source Water Assessment Reports, 1999-2005

Within the drinking water protection areas of these 15 water systems there are 264 potential contaminant sources that have been inventoried 197 of those being high or medium risk. Within the 5-year time of travel zones there are 198 potential contaminant sources, 149 of those being high or medium risk.

Figure 4 shows the top six most prevalent potential contaminant sources by the total number of public water systems impacted rather than by overall frequency as was shown in Table 2.

Figure 4
 Top Six Most Prevalent Potential Contaminant Sources
 in the Southern Willamette Valley Groundwater Management Area
 by the Number of Systems Impacted



Source: Department of Environmental Quality and Department of Human Services-Drinking Water Program, Source Water Assessment Reports, 1999-2005

At least two-thirds of the 15 public water systems have non-irrigated and irrigated crops, wells/abandoned wells, and heavy use roads as potential contaminant sources. All of these potential contaminant sources except non-irrigated agriculture are considered a high or moderate risk. Examples of associated risks include things like the handling and application of nutrients and pesticides by residents and farmers, equipment repair facilities found on many large farms, potential spills on transportation corridors, abandoned wells that can be a direct conduit to the aquifer, etc. All of the most prevalent sources besides transportation are also possible sources of nitrate.

Table 3 is a complete list of all the high, moderate, and most prevalent risks within the five-year time of travel zones. The working group decided to focus on all of the top six most prevalent potential contaminant sources and the high and moderate risks located in the five-year time of travel zone. The working group tailored management strategies to directly mitigate the risks associated with these potential contaminant sources. The goals and strategies developed by the working group to address the risks are included in the next section of this report.

Table 3
 High, Moderate, and Most Prevalent Risks in the Five Year Time of Travel Zones
 in the Southern Willamette Valley Groundwater Management Area
 by Number of Sources Present

Potential Contaminant Source	Number of Sources	Risk
Non-Irrigated Crops	13	Lower
Transportation-Heavy Use Roads	13	Moderate
Large Capacity Septic Systems	12	High
Wells/Abandoned Wells	12	High
Automobiles- Gas Stations and Repair Shops	11	High
Crops-Irrigated	11	Moderate
High-Density Housing	11	Moderate
UST-Confirmed Leaking, Status Unknown, or unregulated	11	High
Above-ground Storage Tanks	10	Moderate
Other	9	
Chemical/Petroleum Storage and Processing	7	High
Historic Gas Stations/Waste Dumps	4	High
Transportation-Railroads	4	Moderate
Furniture/Lumber/Parts Stores	3	Moderate
Machine Shops	3	High
Sewer Lines	3	High
Wood Preserving/Treatment/Pulp/Paper Processing and Mills	3	High
Boarding Stables	2	Moderate
Golf Courses	2	Moderate
Grazing Animals	2	High
Rural Homesteads- Machine Shops	2	High
Lagoons/Liquid Wastes	2	High
Parking Lots/Malls	2	High
Pesticide/Fertilizer/Petroleum Storage and Processing	2	High
Waste Transfer/Recycling Stations	2	Moderate
Wastewater Treatment Plant	2	Moderate
Construction/Demolition	1	High
Dry Cleaners	1	High
Electric/Electrical Manufacturing	1	High
Food Processing	1	Moderate
Fleet Trucking/Bus Terminals	1	Moderate
Food Processing	1	Moderate
Injection Wells-Class V UICs	1	Moderate
Highly Maintained Lawn Areas	1	Moderate
Medical/Vet Offices	1	Moderate
Mines/Gravel Pits	1	High
Dump Sites	1	Moderate
High-Density Septic Systems	1	High
Stormwater Retention Basin	1	Moderate
Transportation-Right of Ways	1	Moderate

Source: Department of Environmental Quality and Department of Human Services-Drinking Water Program, Source Water Assessment Reports, 1999-2005

Goals and Strategy Recommendations

The comprehensive inventory of potential sources of contamination formed the foundation from which the working group developed specific goals and management strategies. Goals are broad vision statements describing desired conditions or activities in the future. They provide direction for the development of management strategies. The management strategies for each goal describe a more specific course of action. Each goal and related cluster of management strategies includes a background discussion providing the rationale for the goals and management strategies identified for each goal category. Following each goal are the specific strategies with a description of:

- *Actions*
- *Potential Partners*
- *Measures of Effectiveness*

Reduced nitrate in the groundwater and the prevention of other contaminants from reaching groundwater are the ultimate measures of success related to the implementation of strategies and actions identified in this working group report. The Public Drinking Water Working Group has identified project partners and other involved entities, which are listed under *Potential Partners*. The working group, the GWMA Committee, and support staff will seek funding to begin applying these management strategies yet a key question remains: Who is the lead entity ultimately responsible for coordinating the implementation of the strategy recommendations? The DEQ is in charge of approving the Action Plan and it seems that a component of approval will be the allocation of resources (time, funding, and support) to ensure that the Plan is put into practice for the protection of the region's groundwater. The working group is willing to meet periodically to provide input and local governments are steady contributors to the project, but there is still a need for overall coordination.

Goal 1 - Outreach and Education

Increase public awareness of groundwater vulnerability, what resources are available, and what can be done to protect drinking water. Develop new materials and/or distribute materials that are already available to increase public awareness of drinking water issues and motivate voluntary action for protection.

The purpose of this goal is to use non-regulatory mechanisms for initiating action. These efforts are intended to inform citizens about the source of their drinking water and actions they can take to protect it. These outlets include news media, roadside signs, mailings, fact sheets, school programs, and existing educational programs. This general goal led to a number of specific strategies that are relatively inexpensive and easy to implement.

Outreach and Education Objectives:

- A random survey three years after Action Plan approval, shows 75 percent of the GWMA population is aware of groundwater vulnerability and groundwater protection activities

- Within three years after Action Plan approval, a random survey shows that 50 percent of residents and 50 percent of targeted businesses have changed at least one practice to improve groundwater protection and/or water conservation.

Outreach and Education Strategies

◆ Notify local emergency response planners of the locations of the Drinking Water Protection Areas and ensure that water system operators are notified in case of a spill or other emergency that may impact the water supply

Actions:

- Compile a list of all the agencies involved with spill response, create maps of the Drinking Water Protection Areas in the region, and obtain contact information
- Contact agencies and determine if they need maps of drinking water protection areas and provide them with water system operator contact information and other information if needed
- Keep information current and make contacts every 2-3 years

Potential Partners:

Water system operators, Public Drinking Water Working Group, GWMA cooperating organizations, project staff

Measures of Effectiveness:

100 percent of emergency response planners have been notified within one year after Action Plan approval. Within five years, all emergency situations that could impact the public water supply have included notification of the relevant public water system operator.

◆ Implement a program to include educational materials on water conservation, household hazardous waste management, and drinking water protection in the utility bills of the four cities in the GWMA and with other water systems where possible

Actions:

- Contact cities, build support, and identify specific water conservation and protection strategies
- Provide information to city and work to determine best format
- Present to governing bodies and distribute templates

Potential Partners: City public works departments, water districts, city officials, working group, and project staff

Measures of Effectiveness: All four cities participating in the information distribution within two years after Action Plan approval

◆ **Distribute GWMA-specific educational materials and drinking water protection materials focused on new development through local planning departments, with permit applications, and at public works offices**

Actions:

- Review available information and develop new GMWA-specific materials as necessary
- Identify distribution methods and locations, get approval, and begin distribution

Potential Partners: Public Drinking Water Working Group partnering with cities, project staff

Measures of Effectiveness: Within one year after Action plan approval four cities and three counties distributing information and 100 percent of all new development applicants receive information. As a result, 50 percent apply protection strategies. Over a three-year period, monitor wastewater flow to look for reduction in hazardous materials

◆ **Erect signs along major roadways to inform people that they are entering a drinking water supply area and provide a contact number for more information**

Actions:

- Determine what information to include and design signs
- Contact public works departments, determine locations for signs, contact appropriate jurisdictions for approval, and erect signs

Potential Partners: Public Drinking Water Working Group, local jurisdictions, water system operators

Measures of Effectiveness: Within two years after Action Plan approval, signs installed along all major roadways. Track the number of calls to informational phone number

◆ **Mail a booklet on proper septic system care, maintenance, and inspection to rural residents within the five-year time of travel zones of drinking water protection areas**

Actions:

- Develop address list of rural residents in the five-year time of travel zones and obtain booklet
- Send booklet (This could be coordinated with a rural resident workshop)

Potential Partners: Public Drinking Water Working Group, GWMA partnering organizations

Measures of Effectiveness: Record the number of booklets mailed. Measure the increase in the number of inspection and/or pumping requests to septic inspectors/maintenance providers in the region over a three-year period.

◆ **Mail letters to residents, commercial and industrial businesses, and farmers informing them of their location within the Groundwater Management Area and the drinking water protection area of a public water system and identify things they can do to help protect the resource**

Actions:

- Develop address list and divide into categories
- Obtain information specific to different land uses and write letters
- Send mailing (This could be coordinated with a rural resident workshop)

Potential Partners: Public Drinking Water Working Group, project staff

Measures of Effectiveness: Mailing completed to all residents and businesses within 2 years of Action Plan approval and record the number of mailings sent.

◆ **Research how groundwater and drinking water education can be incorporated into existing school programs**

Actions:

- Compile information about existing educational programs and research water-related curriculum
- Begin discussion with teachers in the region and present findings to local school boards
- Determine future opportunities and write proposal

Potential Partners: Staff, GWMA cooperating organizations

Measures of Effectiveness: Make contacts with educators within one year after Action Plan approval. Track the number of curriculums obtained and the number of partners interested.

Goal 2 - Financial Incentives

Help landowners and businesses to implement drinking water protection strategies by establishing incentives that lessen economic barriers and assisting interested parties in acquiring resources to implement protection strategies.

One of the major limitations for small water systems and local governments is the availability of funding for new projects. Drinking water protection efforts stand out due to the necessity of a safe drinking water supply, but frequently water system operators and public officials do not take action until it is too late. This problem can be minimized by helping to secure the funding necessary to implement drinking water protection efforts and thinking about creative ways to maximize benefits and minimize costs. The strategies under this goal include incentives for the private and public sector as well as individual citizens.

Financial Incentives Objectives:

- Submit at least three groundwater protection funding proposals per year
- 50 percent increase in the number of household hazardous waste events held each year
- A cost share program for well abandonment and a tax credit program established within three years of the approval of the Action Plan

Financial Incentives Strategies

- ◆ **Document all available funding sources to address drinking water protection issues and share this information with water system operators, public officials, and interested residents (This goal is a precursor to many other strategies)**

Actions:

- Identify all sources and prepare matrix of funding sources
- Make information available to water system operators via website or mailing

Potential Partners: Working group, staff, partner with DHS and DEQ

Measures of Effectiveness: Track the completion of the funding source matrix and the number of funding sources identified. Website completed and/or mailings sent within one year after Action Plan approval.

- ◆ **Explore the possibility of holding region-wide, free household hazardous waste collection events**

Actions:

- Research existing county and city programs and promote existing efforts (partner with schools)
- Obtain support to hold region-wide free collection event and advertise collection event
- Hold event and evaluate success

Potential Partners: Working group, County and city household waste coordinators and public works staff, educators in local schools

Measures of Effectiveness: Number of residents participating in collection events, number of new events held over the next three years.

- ◆ **Develop a local cost-share program for proper well abandonment**

Actions:

- Identify potential funding sources for program, prepare project proposal, and make initial contacts to public officials and staff
- Present proposal to WRD and local officials. Obtain approval from officials
- Launch advertising campaign for the program and monitor participation.

Potential Partners: Water Resources Department, local governments, project staff, GWMA Committee

Measures of Effectiveness: Over the next three years, track the number of jurisdictions to adopt program, number of citizens participating in program, and number of wells properly abandoned.

◆ **Institute tax credits for pollution control technologies and alternative treatment septic systems**

Actions:

- Research the process for establishing tax credits, contact state agencies and state representatives from the region, and develop credit structure
- Determine qualified technologies and systems
- Prepare project details for legislative session, gather support, and begin political process
- Implement tax credit and begin promoting the opportunity

Potential Partners: Elected officials, DHS, DEQ, working group, GWMA Committee, project staff

Measures of Effectiveness: Implementation of tax credit within five years after the approval of the Action Plan. Monitor the number of tax credits applied for.

Goal 3 - Water Conservation

Increase water conservation in public and private operations by emphasizing cost-savings and through the use of best management practices, resource sharing, and education.

The goal of the water conservation strategies is to reduce water consumption through a number of different techniques. Some of these techniques overlap with other goals, but the working group felt it was important to draw out water conservation as a separate goal due to its many benefits. A publication produced by the National Center for Small Communities entitled "A Small Town Source Water Primer: Building Support for Protection Programs" noted several ways that water conservation promotes water safety such as:

- Lowers demand on groundwater and reduces the chance that pollutants will be drawn into the water supply
- Places less demand on septic systems, reducing the risk of groundwater contamination
- Minimizes runoff of agricultural pollutants through efficient irrigation
- Lowers level of water treatment that uses fewer chemicals, less energy and lowers operation, maintenance, and replacement costs

- Saves money on water operations freeing up funding for other water quality, public health, and water treatment needs
- The prudent use of resources underlies both conservation and pollution prevention

Water Conservation Objectives:

- Decrease the average household use of water by 10 percent within five years after the approval of the Action Plan. This can be measured by compiling data on existing average household use from systems that meter water and tracking changes.
- Compare that amount with average household use every two years after approval of the Action Plan.

Water Conservation Strategies

◆ Present information on utility bills to show that water conservation equals costs savings and provide to municipalities and other rate collectors in the GWMA

Actions:

- Contact water systems to gather information about current billing practices and determine willingness to participate
- Research examples of billing formats and potential cost saving advice
- Present findings to water system operators and public officials for implementation

Potential Partners: Working group, staff, city and county staff, city officials, and water system operators

Measures of Effectiveness: Establish a baseline of water consumption in municipalities. Monitor and compare municipal water consumption annually. All four cities have considered participating in this effort within two years after Action Plan approval.

◆ Provide access to water-saving products, such as low-flush toilet converters, low-flow showerheads, and faucet aerators, through public-private partnerships and incentive-based programs

Actions:

- Identify products available and contact businesses to determine bulk prices and other funding options
- Meet with city and county staff and present details of implementing a large scale distribution program
- Create promotional materials for obtaining water-saving products and begin distribution program

Potential Partners: Public Drinking Water Working Group and staff do initial research, public works departments, water system operators, and public officials take responsibility and implement program once established

Measures of Effectiveness: Record the number of jurisdictions involved. Track the number of products obtained and distributed. Monitor water usage to determine decreases.

Goal 4 - Recognition Programs

Recognize and promote actions that are being taken to protect drinking water in order to build a positive reputation for those taking actions and to encourage other drinking water protection activities.

Many programs designed to protect drinking water are already in place. Also, many businesses and citizens have taken action to protect drinking water by eliminating or reducing harmful byproducts from their activity. It is important to recognize these efforts in order to encourage others to take action. These programs are low-cost, positive campaigns to seek out the good work already being done in the region to protect this indispensable resource.

Recognition Program Objective:

- Programs are established and have active participation within three years.

Recognition Programs Strategies

💧 Motivate property owners, landscaping business owners/employees, and others to employ healthy lawn management practices that will reduce the risk of leaching nitrate and other contaminants into the groundwater

Actions:

- Develop standards for good lawn management practices and develop advertising campaign (Use resources from DEQ's Healthy Lawns program and partner with OSU Extension)
- Get media coverage for those companies/homeowners who are meeting standards

Potential Partners: Working group, staff

Measures of Effectiveness: Track the number of people participating and changing behavior to follow guidelines.

💧 Establish a region-wide annual awards program for leaders in protecting drinking water classified by land use (agriculture, residential, commercial/industrial, and municipal)

Actions:

- Decide format for determining recipient and seek business partners/contributions
- Advertise award and request recommendations, design award, and form committee to meet annually and decide on recipient
- Present award and advertise results

Potential Partners: Working group, business partners, and staff

Measures of Effectiveness: Track the number of business partners and number of applicants for the award.

◆ **Explore the possibility of extending an auto shop certification program into the Southern Willamette Valley**

Actions:

- Research and contact the Eco-Logical Business program in the Portland area, check into existing programs, compile list of auto shops in the region, obtain materials, and set up website
- Contact auto shop owners, conduct site visits, and form a network for auto shops to share information
- Recognize outstanding auto shops in various media and advertising outlets

Potential Partners: GWMA cooperating organizations, working group

Measures of Effectiveness: Record the number of supporting organizations, number of auto shops contacted, and number of auto shops following guidelines. Monitor the decrease in the number of hazardous waste violations.

Goal 5 - Technical Assistance and Training

Supplement existing employee training programs and provide GWMA-specific information to trainers. Seek out technical assistance opportunities related to drinking water protection and coordinate with interested organizations to provide assistance to farmers, businesses, employees, and homeowners.

Technical assistance and training opportunities are an important consideration when asking individuals, businesses, and governments to change how they operate. Within the Southern Willamette Valley the working group identified some potential partners in the effort to work with water system operators and others for working with farmers, businesses, and other landowners. This goal also incorporates forums that facilitate information-sharing. The group specifically mentioned working with OSU Extension Service, Water Resources Department (WRD) and the DEQ as well as local planning departments in conducting trainings.

Technical Assistance and Training Objectives

The objectives of the Technical and Training Assistance goal:

- Within three years of approval of the Action Plan 100 percent of the high and medium risk businesses within the 5-year time of travel zones have been contacted about the GWMA and 50 percent of those businesses have changed at least one practice that will better protect groundwater.

- 75 percent of all high and medium risk businesses in the 5-year time of travel have incorporated drinking water protection information as part of their training programs.

Technical Assistance and Training Strategies

- ◆ **Form and coordinate a multi-jurisdiction Pollution Prevention Team for the Southern Willamette Valley including city staff and officials, county staff and officials, landowners, commercial and industrial operations, homeowners, and public agencies**

Actions:

- Research funding options and examples of pollution prevention teams, prepare supporting documents
- Obtain support from jurisdictions in the region through presentations and staff contacts, secure funding and in-kind support
- Invite staff and professionals to be involved in the team and begin developing pollution prevention actions

Potential Partners: Staff, GWMA cooperating organizations

Measures of Effectiveness: This strategy needs nearly full participation (at least 90 percent) to be effective. Track financial support received. Document the formation and proceedings of the Pollution Prevention Team.

- ◆ **Provide forums designed to make technical assistance and training opportunities available to water systems, local government officials, and planning staff regarding protecting drinking water within the established drinking water protection areas**

Actions:

- Public water systems sponsor a training session for area planners and community leaders
- Establish an annual meeting of public water system operators to be held in the anniversary month of the implementation of the Action Plan
- Provide drinking water protection training materials to local businesses that have training programs

Potential Partners: Water system operators, working group, GWMA Committee, DHS, DEQ, project staff

Measures of Effectiveness: Monitor the number of businesses that have received materials and the number of businesses incorporating drinking water protection training over the three years after Action Plan approval. Monitor attendance at annual meeting and training sessions.

- ◆ **Through partnership with OSU Extension Service, sponsor workshops in the region for property owners about septic system and well care and incorporate information about the need to permanently abandon and properly decommission wells that are not in use.**

Actions:

- Compile information related to proper well abandonment and related penalties
- Partner with WRD and OSU Extension to sponsor homeowner workshops
- Work with WRD to offer on-site well assessments, if requested

Potential Partners: WRD, OSU Extension, working group, staff

Measures of Effectiveness: Record the number of participants at each workshop. Measure the increase in the number of well assessments and proper decommissioning.

- ◆ **Sponsor an open house event and invite the DEQ to talk with business managers and owners within the drinking water protection areas within the GWMA. Focus the discussion on pollution prevention practices and available assistance**

Actions:

- Contact DEQ, send letters to businesses, and compile information for the workshop
- Provide fact sheets at the workshop, educate businesses about land use issues and groundwater concerns, and evaluate success of workshop

Potential Partners: DEQ Pollution Prevention Program, water system operators, working group, staff

Measures of Effectiveness: Document the number of businesses at the event and the number of businesses implementing new practices and/or becoming involved in the DEQ Pollution Prevention Program through a follow-up survey within two years.

- ◆ **Establish a mentoring program with large businesses helping smaller, less regulated businesses in the drinking water protection areas**
(This strategy acts as a follow-up to the open house strategy)

Actions:

- Ask businesses to participate in mentoring effort to assist small businesses in developing spill response plans,
- Share spill response resources with small companies and sponsor joint employee training workshops

Potential Partners: Working group, city and county staff, GWMA cooperating organizations

Measures of Effectiveness: Record the number of large and small businesses that participate and the number of spill response plans developed. Complete 3-5 training workshop in the two years after approval of the Action Plan.

◆ **Partner with agricultural organizations to coordinate on-farm assessments of irrigation and fertilizer practices**

Actions:

- Compile contact list of agricultural organizations, develop project proposal, and make initial contact with staff
- Develop application process and advertise opportunity for farmers to participate in on-farm assessment
- Conduct assessments and maintain relationship with participating farmers to monitor results

Potential Partners: Working group, project staff, agricultural agencies and organizations, farmers

Measures of Effectiveness: Record the number of applications filed for assessment and the number of assessments completed. Track changes made after assessment through follow-up contacts.

Goal 6 - Zoning/Health Ordinances

Encourage land use planning and public health procedures that prevent or minimize groundwater contamination. Provide examples of drinking water protection measures to city and county public officials.

As a component of working with local governments to ensure that drinking water is protected, decision-makers will be able to determine what tools can be used to prevent contamination. Two of these tools are local land use planning and ordinances designed to protect public health. The working group decided that the 5-year time of travel zone as indicated in the Source Water Assessments, is a particular area that should be protected.

Zoning/Health Ordinance Objectives

- Within three years of the approval of the Action Plan all local jurisdictions in the GWMA have been approached about possible zoning/health ordinance changes and have at least considered making changes in current zoning designations and land use development review procedures.

Zoning/Health Ordinances Strategies

- ◆ **Work with local jurisdiction to consider establishing drinking water protection overlays in the 5-year time of travel zones of the Community and Non-Transient, Non-Community water systems in the GWMA.**

Actions:

- Research drinking water protection overlays and find examples of model ordinances
- Establish a contact list of planning staff and elected officials in the GWMA, meet with city and county planners and prepare draft overlay zone
- Assist staff in proposing overlay zone to planning commissions and elected officials

Potential Partners: Working group, water system operators, planning staff, GWMA committee

Measures of Effectiveness: Number of jurisdictions involved within three years after Action Plan approval, number of overlay zones adopted

- ◆ **Provide information to staff and local officials about model ordinances available to governing bodies to implement drinking water protection measures and information detailing examples of communities that had to address contaminated drinking water**

Actions:

- Compile information about the costs of drinking water contamination and examples of ordinances other than overlay zones
- Contact public officials and staff and arrange a time to discuss potential drinking water protection measures
- Meet with cities and counties. Identify barriers to implementation and propose solutions to address these issues.

Potential Partners: Working group, GWMA Committee, public officials and staff, project staff

Measures of Effectiveness: Information compiled, meetings held with all four cities and three counties to discuss options within two years after Action Plan approval

- ◆ **Request county and city planning departments notify water system operators of all proposed development actions in the 5-year time of travel zones or provide operators with web-site information where they can access development information**

Actions:

- Compile contact information of all county and city planning staff and create detailed maps of the 5-year time of travel zones within each jurisdiction.
- Obtain support from water system operators and provide information to planning staff.

- Monitor development actions within the 5-year time of travel zones

Potential Partners: Working group, GWMA Committee, water system operators, planning staff, project staff

Measures of Effectiveness: Maps created and contact made with all planning departments within two years after approval of the Action Plan. Monitor the contact made by planning departments to water system operators

Goal 7 - Regulation and Enforcement

Work with regulatory authorities to provide prioritized, focused, and customized enforcement efforts for regulated and permitted activities within the five year time of travel drinking water protection areas

Time of travel zones have been delineated for every public water system in the GWMA. The working group felt it was important to put this information to work to focus efforts on the areas most susceptible to contamination. The five year time of travel zone is the most logical consideration when seeking to implement effective drinking water protection efforts because those are the areas closest to the wells. Land use activities within these areas should be closely monitored to ensure compliance with existing regulations and new regulations should be considered for these areas to protect drinking water where it is most vulnerable.

Regulation and Enforcement Objective

- The Water Resources Department (WRD), the DEQ, and the Department of Gravel and Mining Industries (DOGAMI) have all initiated steps to focus regulatory and enforcement efforts in the GWMA.

Regulation and Enforcement Strategies

- ◆ **Partner with the WRD to better understand the location and concentration of temporarily and permanently abandoned wells in the five year time of travel drinking water protection areas. Help the WRD to prioritize enforcement efforts regarding temporary and permanent well decommissioning**

Actions:

- Contact the WRD to discuss ways to collaborate on identifying wells that should be permanently and properly decommissioned
- Establish a method to prioritize 'higher risk' wells

Potential Partners: Working group, staff, WRD, water system operators, GWMA cooperating organizations

Measures of Effectiveness: Document the number of wells properly decommissioned in the two years following approval of the Action Plan.

◆ **Alert DEQ to the presence of confirmed leaking underground storage tanks and underground storage tanks of unknown status within public water system five-year time of travel drinking water protection areas**

Actions:

- Contact responsible party at regional DEQ office about the known leaking underground storage tanks (USTs)
- Bring DEQ personnel to working group and GWMA Committee meetings to talk about the UST program
- DEQ enforces clean up of leaking USTs

Potential Partners: Working group, staff, DEQ, water system operators

Measures of Effectiveness: All leaking USTs are removed or replaced and those of unknown status are classified in the next five years.

◆ **Notify DOGAMI of the sand and gravel mining operation within the drinking water protection area and stress the importance of providing operators with best management practices to reduce risks to groundwater contamination**

Actions:

- Compile groundwater protection mining BMP information, contact DOGAMI and provide them with a map of and information about high priority operations
- Encourage DOGAMI to focus efforts on operations in or close to drinking water protection areas

Potential Partners: Working group, staff, DOGAMI, aggregate/mining companies

Measures of Effectiveness: Track the changes made by DOGAMI and the aggregate/mineral industries in the region over the next five years.

◆ **Provide ODA with a map of the drinking water protection areas and the CAFO sites within the 5-year time of travel zones to help ensure compliance with permits. Provide information to ODA about the GWMA that can be shared with CAFO operators during site visits.**

Actions:

- Compile CAFO BMPs, contact ODA, give them a map and information about high priority operations
- Urge ODA to maintain routine site visits to these CAFOS and inform operators of their location within the drinking water protection area

Potential Partners: Working group, staff, ODA, farmers and CAFO operators

Measures of Effectiveness: Track efforts initiated by the ODA and the number of CAFOs contacted.

- ◆ **Provide the DEQ with a map of the drinking water protection areas and request that they make the drinking water protection areas a priority for enforcing regulations regarding large septic systems and underground injection control**

Actions:

- Contact DEQ and provide them with maps of the drinking water protection areas
- Prepare a fact sheet targeting permitted and regulated entities that describes the risks, liabilities, and costs related to groundwater contamination and ask the DEQ to distribute to permitted facilities

Potential Partners: Working group, staff, DEQ, large on-site wastewater system operators, GWMA cooperating organizations

Measures of Effectiveness: Document the activities initiated by the DEQ in the years following approval of the Action Plan.

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